In the claims, claims 1-38 were pending.

Claims 1-5, 7, 16-20, 26-27, 29-31 and 36-38 stand rejected. Claims 1, 26-27, 29, and 36 were previously amended. Claims 21-25, 28, and 32-35 are canceled. This listing of the claims will replace all prior versions, and listings, of claims in the application:

LISTING OF THE CLAIMS

1 (previously presented): A microfluidic device for separating the components of a fluid sample, the microfluidic device comprising:

a substrate having a microchannel formed in a surface thereof;

a cover plate arranged over the substrate surface, the cover plate in combination with the microchannel defining a separation conduit for separating the components of the fluid sample according to a specific component property, wherein the separation conduit has an inlet port and an outlet port; and

an integrated gradient-generation means for generating a gradient of a selected mobile-phase component in a mobile phase by the use of pressure driven flow, and adapted to allow the mobile phase from the gradient-generation means to be transported through the inlet port into the separation conduit and out of the outlet port.

2 (original): The microfluidic device of claim 1, wherein the integrated gradient-generation means is formed at least in part within the substrate.

3 (original): The microfluidic device of claim 1, wherein the integrated gradient-generation means is formed at least in part in the cover plate.

4 (original): The microfluidic device of claim 1, wherein the integrated gradient-generation means comprises:

a mobile-phase holding conduit having a length defined by an upstream terminus and a downstream terminus;

a plurality of mobile-phase inlet ports arranged along the length of the mobile-phase holding conduit;

a mobile-phase outlet port located downstream from the mobile-phase inlet ports; and

a means for introducing the mobile phase from the mobile-phase holding conduit through the mobile-phase outlet port and into the inlet port of the separation conduit.

5 (original): The microfluidic device of claim 4, wherein the mobile-phase inlet ports are evenly spaced along the length of the mobile-phase holding conduit.

6 (withdrawn): The microfluidic device of claim 4, wherein no mobile-phase inlet port is located at the upstream terminus of the mobile-phase holding conduit.

7 (original): The microfluidic device of claim 4, wherein no mobile-phase inlet port is located at the downstream terminus of the mobile-phase holding conduit.

8 (withdrawn): The microfluidic device of claim 4, wherein the gradient-generation means further comprises a distribution conduit in fluid communication with the mobile-phase holding means.

9 (withdrawn): The microfluidic device of claim 8, wherein the distribution conduit is substantially parallel to the mobile-phase holding conduit.

10 (withdrawn): The microfluidic device of claim 8, wherein the distribution conduit further comprises a plurality of outlet ports, each fluidly communicating via a mixing conduit with an inlet port of the mobile-phase conduit.

11 (withdrawn): The microfluidic device of claim 10, wherein the distribution conduit further comprises an inlet port located between each of its outlet ports.

12 (withdrawn): The microfluidic device of claim 8, wherein the distribution conduit comprises two inlet ports.

13 (withdrawn): The microfluidic device of claim 12, further comprising two mobile-phase sources in fluid communication with the integrated gradient-generation means, wherein at least one of the mobile-phase sources contains the selected mobile-phase component.

14 (withdrawn): The microfluidic device of claim 13, wherein one of the mobile-phase sources does not contain the selected mobile-phase component.

15 (withdrawn): The microfluidic device of claim 13, wherein one of the mobile-phase sources contains the selected mobile-phase component in a substantially pure form.

16 (original): The microfluidic device of claim 1, further comprising a means for controlling fluid communication between the gradient-generation means and the separation conduit.

17 (original): The microfluidic device of claim 1, further comprising separation media within the separation conduit.

18 (original): The microfluidic device of claim 1, further comprising a polymeric material formed *in situ* within the separation conduit.

19 (original): The microfluidic device of claim 1, wherein the separation conduit exhibits a high surface area-to-volume ratio.

20 (original): The microfluidic device of claim 1, wherein the component property is selected from the group consisting of molecular weight, polarity, hydrophobicity, and charge.

21-25 (canceled).

26 (previously presented): A microfluidic device for separating the components of a fluid sample, the microfluidic device comprising:

(a) a gradient-generation means for generating a gradient of a selected mobile-phase component in a mobile phase by the use of pressure driven flow comprising

(i) a substrate having a microchannel formed in a surface thereof, wherein the microchannel has an upstream terminus and a downstream terminus,

(ii) a cover plate arranged over the substrate surface, wherein the cover plate, in combination with the microchannel, forms a mobile-phase holding conduit having a length defined by the upstream terminus and the downstream terminus,

(iii) a plurality of inlet ports arranged along the length of the mobile-phase holding conduit, and

(iv) an outlet port located downstream from the inlet ports of the mobile-phase holding conduit;

(b) a separation conduit for separating the components of a fluid sample according to a specific component property; and

(c) a means for introducing the mobile phase from the gradient-generation means into the separation conduit.

27 (previously presented): A microfluidic device for separating the components of a fluid sample, the microfluidic device comprising:

a substrate having a microchannel formed in a surface thereof;

a cover plate arranged over the substrate surface, such that the cover plate, in combination with the microchannel, defines a separation conduit for separating the components of the fluid sample according to a specific component property, wherein the separation conduit has an inlet port and an outlet port; and

an integrated mobile-phase source comprising a microconduit having a length defined by an upstream terminus and a downstream terminus, the microconduit containing a mobile phase that exhibits a gradient of a selected mobile-phase component along the length of the microconduit, wherein the gradient is generated by the use of pressure driven flow,

wherein the integrated mobile-phase source is arranged to allow the mobile phase to be transported through the inlet port into the separation conduit and out of the outlet port.

28 (canceled).

29 (previously presented): A microfluidic device for producing a flow of mobile phase:

(a) mobile-phase source comprising

(i) a mobile-phase holding microconduit having a length defined by an upstream terminus and a downstream terminus, and an outlet port located at the downstream terminus, and

(ii) a mobile phase, contained in the mobile-phase holding microconduit, that exhibits differing concentrations of selected mobile-phase component along the length of the mobile-phase holding microconduit, wherein the differing concentrations are generated by the use of pressure driven flow; and

(b) a means for pressurizing the microconduit to force the mobile phase within the microconduit to flow toward the downstream terminus along the length of the microconduit and out the outlet port.

30 (original): The microfluidic device of claim 29, further comprising a separation conduit in fluid communication with the outlet port of the microconduit.

31 (original): The microfluidic device of claim 29, wherein the microconduit is further defined by a substrate having a microchannel formed in a surface thereof in combination with a cover plate arranged over the substrate surface.

32-35 (canceled).

36 (previously presented): A microfluidic device for producing a flow of mobile phase, the microfluidic device comprising:

(a) a means for producing different concentrations of a selected mobile-phase component in different locations within a mobile phase by the use of pressure driven flow, comprising

(i) a mobile-phase-holding microconduit having a length defined by an upstream terminus and a downstream terminus,

(ii) an outlet port located at the downstream terminus of the mobile-phase holding microconduit, and

(iii) at least one inlet port in fluid communication with the mobile-phase holding microconduit upstream from the outlet port;

(b) a plurality of mobile-phase sources each containing a mobile phase, wherein each mobile phase contains a different concentration of a selected mobile-phase component;

(c) a means for introducing plugs of mobile phase from the mobile-phase sources through the at least one inlet port into the mobile-phase holding conduit such that the plugs are arranged in a predetermined order along the length of the mobile-phase holding conduit; and

(d) a means for pressurizing the microconduit to force the mobile phase within the microconduit to flow toward the downstream terminus along the length of the microconduit and out the single outlet port.

37 (original): The microfluidic device of claim 36, further comprising a separation conduit in fluid communication with the outlet port of the microconduit.

38 (original): The microfluidic device of claim 36, wherein the mobile-phase holding microconduit is further defined by a substrate having a microchannel formed in a surface thereof in combination with a cover plate arranged over the substrate surface.